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## MOLLUSCA CONTEMPORANEOUS WITH THE MASTODON.

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In THE NAUTILUS for March, 1891, (Vol. VI, p. 131) there is given a list of half a dozen species of fresh-water shells which were found associated with the remains of a mastodon discovered in Randolph County, Indiana. Through the courtesy of Mr. W. Hilles Smith of Niles, Michigan, I have recently had an opportunity of examining a quantity of material taken from the muck beneath the remains of a mastodon found near that city.

As the list of species is a considerable one it is of interest not only because of the circumstances, under which they were found, but also as a basis for comparison with similar finds from other localities.

As has been stated by others in reference to the mollusca formed fossil in the loess there is here, in most instances, little, if any, variation from the usual form of the species as they are found living at the present time.

The *Planorbis companulatus* Say and *bicarinatus* Say are both larger than the average size of the species as usually found. In the latter species there is a decided tendency towards a whorl narrow in proportion to its height, with a strong carina on both sides, resulting in a long narrow aperture in mature examples.

One of the most abundant species in the collection was *Valvata tricarinata* Say, which afforded some unusual forms. As is well known, this species is extremely variable in its sculpture, ranging though the bicarinate and unicarinate forms to that which is ecarinate. In this, however, all the specimens are strongly tricarinate and the variation is in the other direction and in the form of additional carinæ. This, in one instance, appears as a fourth carina on the body whorl about half way between the superior and peripheral carinæ in the normal shell. In another specimen, a fourth carina is sud-

denly developed upon the shoulder of the last whorl parallel with superior carina and at about one-third of the distance between it and the suture. The interval between the two being a groove, rather than a continuation of the flat surface of the shoulder. In a somewhat similar specimen there is no distinct carina developed, but simply a sharp edge, where the flattened surface of the shoulder is cut by the groove which encircles it just inside the superior carina. In two other examples, the suture of the last half of the body whorl is decidedly channelled, increasingly so as it approaches the aperture, with an indistinct elevation hardly sufficient to be termed a carina, bordering its outer edge.

Although these variations were found in only half a dozen specimens out of a considerable number, it is nevertheless worthy of notice, that in each instance the growth of the shell had been entirely normal until about the beginning of the last whorl. Then suddenly and apparently after a period of rest, such as hibernation, with a renewal of growth the change of sculpture begins. This would naturally seem to be the result of some change in the environment. But, whatever was its source, it was not sufficient, evidently, to affect the whole colony. However, as some of the examples are not fully grown, it may be possibly attributed to the same cause, which very shortly exterminated them all. Unfortunately, what that was, is purely a matter of conjecture.

The complete list of the species found is as follows:

Zonites radiatulus Ald.	Annicola lustrica Pils.
Strobilops labyrinthica Say.	Campeloma integra Say.
Succinea ovalis Gld.	Campeloma obesa Lewis.
Carychium exiguum Say.	Campeloma subsolidum Anth.
Limnæa stagnalis L.	Pleurocera elevatum Say.
Limnæa desidosa Say.	Goniobasis livescens Mke.
Limnæa humilis Say.	Unio ventricosus Bar.
Physa ancillaria Say.	Unio spatulatus Lea.
Physa heterostropha Say.	Unio novi-eboraci Lea.
Physa integra Hald.	Unio pressus Lea.
Planorbis deflectus Say.	Margaritina rugosa Bar.
Planorbis parvus Say.	Margaritina deltoidea Lea.
Planorbis bicarinatus Say.	Anodonta subcylindræca Lea.
Planorbis trivolvis Say.	Anodonta Footiana Lea.
Planorbis campanulatus Say.	Sphærium simile Say.
Ancylus rivularis Say.	Sphærium striatinum Lam.
Valvata tricarinata Say.	Pisidium compressum Prime.
Annicola limosa Say.	Pisidium sp.